

## I. REMARKS

Claims 1-20 are pending in this application. Applicants respectfully request reconsideration of claims 1-20.

Claims 1-20 have been rejected under 35 U.S.C. § 103(a) over Kruecke et al. (U.S. Patent No. 6,080,799) ("Kruecke I") in view of Moore et al. (U.S. Patent No. 5,658,962). The rejection is respectfully traversed.

Applicants maintain that technical problem of the present invention is "to have available mixtures comprising HFC 365mfc, to be used in substitution of HFC 141b to obtain polymeric foams, in particular polyurethane foams, having improved properties as regards [to] the substantial maintenance in time of the thermoinsulating properties, in particular of the thermal conductivity" (specification, page 4, lines 17-22) (emphasis added). The present invention discloses "[c]ompositions of fluids for preparing polymeric foams comprising... HFC 365mfc... and one or more fluorinated compounds... having boiling point from 50°C to 150°C, and having the formula  $R^1-R_f-R$  (I)" (claim 1). Applicants have found that "the hydrofluoroethers used in the composition of the present invention... are chemically inert compounds... [that] are neither foaming agents nor cell size modifiers" (specification, page 13, lines 12-15) (emphasis added). Applicants submit that "the cell sizes of the polyurethane foam are not substantially different from those of the polymeric foam obtained with HFC 365mfc alone" (specification, page 13, lines 16-19) (emphasis added). In other words, the hydrofluoroethers of the claimed invention, when used in a composition with HFC 365mfc, unexpectedly do not behave as blowing agents and do not foam the polymer.

In contrast, Kruecke I discloses “mixtures... [that] contain or consist of 50 to 99% by weight of 1,1,1,3,3-pentafluorobutane (HFC 365 mfc) and 1 to 50% by weight of at least one fluorinated hydrocarbon selected from the group consisting of 1,1,1,2-tetrafluoroethane, 1,1,1,3,3-pentafluoropropane, 1,1,1,3,3,3-hexafluoropropane, and 1,1,1,2,3,3,3-heptafluoropropane” (Kruecke I, col. 1, lines 54-60) (emphasis added). Specifically, Kruecke I discloses that “the blowing agents may, if desired, contain fluorinated hydrocarbons such as 1,1,1,2-tetrafluoroethane, 1,1,1,3,3-pentafluoropropane, 1,1,1,3,3-pentafluorobutane, or 1,1,1,3,3,3-hexafluoropropane” (Kruecke I, col. 1, lines 32-36) (emphasis added). In other words, Kruecke I discloses that it is known in the art that the named fluorinated hydrocarbons can be part of blowing agent mixtures.

Applicants agree with the Examiner that Kruecke I “differs from applicants’ claims in that hydrofluoroalkyl ethers and/or other hydrofluoro-compounds as claimed by applicants are not particularly required” (February 3, 2006 Office Action, page 3, lines 15-16) (emphasis added). Further, Applicants maintain that Kruecke I does not teach or suggest the use of the hydrofluoroethers of formula (I). As such, Kruecke I does not teach or suggest mixtures “comprising HFC 365mfc... having improved properties as regards [to] the substantial maintenance in the time of the thermoinsulating properties, in particular of the thermal conductivity” (specification, page 4, lines 17-22) (emphasis added).

Applicants submit that Moore et al. does not satisfy the deficiencies of Kruecke I. Moore et al. merely discloses “omega-hydrofluoroalkyl ether compounds [that]... can be used in applications where... CFCs, HCFCs or halons have been used, for example,

as... blowing agents or cell size regulators in making polyurethane foam insulation” (Moore et al., col. 4, lines 4-12) (emphasis added). Applicants submit that one of ordinary skill in the art would not have been motivated to combine the HFC 365mfc of Kruecke I with the hydrofluoroalkyl ethers of Moore et al., which are used as blowing agents. In fact, one of skill in the art reviewing Kruecke I and searching for a further blowing agent to be used in an admixture with HFC 365mfc would likely have been led away from the presently claimed invention, as the hydrofluoroethers of Formula (I) do not function as blowing agents when employed in mixtures with HFC 365mfc.

Further, according to the present invention, only a selected class of hydrofluoroethers of formula (I), those having a boiling point from 50°C to 150°C, are suitable for combination with HFC 365mfc in order to solve the technical problem of the present invention. In contrast, Moore et al. teaches hydrofluoroethers having a wide range of boiling points, from 40°C (Moore et al., col. 14, line 66) to 195°C (Moore et al., col. 18, line 51). Applicants submit that Moore et al. does not teach or suggest combining a hydrofluoroether having a “boiling point range of 50°C to 150°C” with hydrofluorocarbon (HFC), much less with HFC 365mfc (claim 1).

Applicants note that a mixture containing HFC 365mfc and a hydrofluoroether having a boiling point greater than 150°C does not solve the technical problem of the present invention. For example, in comparative Example 9 of the specification, a foam formed with a mixture of HFC 365mfc and  $\alpha$ ,  $\omega$  di-hydro-perfluoropolyether having an average boiling temperature of 178°C showed a “cellular structure [with]... big holes, very large and unhomogeneous cells” and “the manufactured article was not commercially usable” (specification, page 20, line 15 to page 21, line 3). In contrast,

Applicants submit that “the addition of the formula (I) compounds [with boiling points of 50°C to 150°C] allows to decrease the thermal conductivity of polymeric foams and to substantially limit the increase occurring with  $\lambda$ -aging” (specification, page 13, lines 20-24). Applicants note that “aging is due to the loss of the insulating gas from polymeric foam cells” and submit that the large holes created by a mixture of HFC 365mfc and a hydrofluoroether of boiling point of greater than 150°C would appear to accelerate aging because of the decreased ability to entrap air (specification, page 14, lines 7-8). As such, Applicants submit that the specification and Examples sufficiently demonstrate unexpected results commensurate in scope with the presently claimed invention.

Further, Applicants maintain that “it is surprising and unexpected” that the compositions of the present invention maintain thermoinsulating properties over time (specification, page 10, lines 14-17). Applicants have evaluated the thermal conductivity of HFC 365mfc foams and HFC 365mfc/hydrofluoroether foams over a 35 day storage period. Applicants have found that compositions including HFC 365mfc and hydrofluoroethers with boiling points between 50°C to 150°C exhibit improved thermal conductivity over compositions containing HFC 365mfc alone. As soon as 24 hours into the storage period, the foams containing HFC 365mfc and hydrofluoroethers showed lower thermal conductivity than the HFC 365mfc foams. See Table II, specification, page 24.

Applicants note that the same result is seen at the end of the storage period. Accordingly, Applicants submit that the foams comprising the composition of claim 1 have improved thermal conductivity.

For at least the above reasons, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1-20 under 35 U.S.C. § 103(a) over Kruecke I in view of Moore et al.

Claims 1-3, 5-18, and 20 have been rejected under 35 U.S.C. § 103(a) over Kruecke et al. (U.S. Patent No. 6,380,275) ("Kruecke II") in view of Klug et al. (U.S. Patent No. 5,605,882). The rejection is respectfully traversed.

Applicants resubmit that the claimed invention is directed to "compositions of fluids for preparing polymeric foams comprising: HFC 365mfc... and one or more fluorinated compounds... having boiling point from 50°C to 150°C, and having formula  $R^1-R_F-R$  (I)" (claim 1) (emphasis added).

In contrast, Kruecke II discloses "1,1,1,3,3-pentafluorobutane (HFC-365mfc), in admixture with certain other blowing agents" (Kruecke II, col. 1, lines 54-56). Applicants agree with the Examiner that Kruecke II "differs from applicants' claims in that hydrofluoroalkyl ethers and/or other hydrofluoro-compounds as claimed by applicants are not particularly required" (February 3, 2006 Office Action, page 5, lines 8-9) (emphasis added).

Further, Applicants submit that Klug et al. does not satisfy the deficiencies of Kruecke II. Applicants disagree with the Examiner's statement that Klug et al. discloses the compounds of the claimed invention. In contrast, Klug et al. discloses fluoroethers, numbered 1-19 in columns 3-4, where all but one of the compounds, i.e, number 1 hexafluorodimethyl ether ( $CF_3OCF_3$ ), has a boiling point below 50°C. However, Applicants submit that  $CF_3OCF_3$  is not disclosed by formula (I) of the present claim 1. Therefore, Applicants respectfully submit that Klug et al., like Moore et al., does not

teach or suggest the fluorinated compounds of the presently claimed invention "having boiling point from 50°C to 150°C, and having formula R'-R<sub>F</sub>-R (I)" (claim 1).

For at least the above reasons, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1-20 under 35 U.S.C. § 103(a) over Kruecke II in view of Klug et al.


## **II. CONCLUSION**

Applicants respectfully submit that in view of the remarks above, and the amendments and remarks in the May 3, 2006 Amendment After Final Rejection, all outstanding rejections are overcome and this application is in condition for allowance and such action is earnestly solicited. If the Examiner believes that anything further is desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned representative at the telephone number listed below to schedule a personal or telephone interview to discuss any remaining issues.

In the event this response is not timely filed, Applicants hereby petition for an appropriate extension of time. The fee for this extension, along with additional fees required, may be charged to Deposit Account No. 01-2300, referencing Attorney Docket No. 108910-00121.

Respectfully submitted,

ARENT FOX PLLC



Richard J. Derman

Registration No.: 39,107

Customer No.: **004372**

1050 Connecticut Avenue, N.W.  
Washington, D.C. 20036-5339

Telephone No.: 202-857-6000  
Facsimile No.: 202-857-6395

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